Message

From: Wu, Jennifer [Wu.Jennifer@epa.gov]
Sent: 9/20/2018 6:05:32 PM
To: Soscia, Mary Lou [Soscia.Marylou@epa.gov]; Weber, Courtney [Weber.Courtney@epa.gov]
Subject: FW: WA Hydro permits and Fact Sheets on Columbia River
Attachments: 091818_Lower_Columbia_dams_pre-draft_ Fact_Sheet.pdf; 091818_Dalles_WA0026778_pre_draft_permit.pdf

FYI, Mary Lou and Courtney. Mary Lou, I'm going to send you another email with complete set of permits and fact sheets our for draft 401 cert request to Ecology.

From: Palmer, John
Sent: Thursday, September 20, 2018 10:40 AM
To: Laurie Beale - NOAA Federal <laurie.beale@noaa.gov>
Cc: Ryan Couch - NOAA Federal <ryan.couch@noaa.gov>; Ritchie Graves <Ritchie.Graves@noaa.gov>; Wu, Jennifer <Wu.Jennifer@epa.gov>
Subject: WA Hydro permits and Fact Sheets on Columbia River

Hi Laurie,

Thank you for arranging an intro meeting next Monday on the EPA's upcoming hydro NPDES permits. EPA will be issuing permits for the lower Columbia Dams, lower Snake Dams, and Grand Coulee Dam (9 permits), which we are thinking of batching as one ESA consultation. These permits will authorize and limit discharges from non-contact cooling water and process water, with effluent limits on oil/grease and pH along with monitoring and BMPs (see example of limits below). They will also require Best Technology Available (BTA) for the cooling intake structures per CWA 316(b) and EPA's regs. (see permit language below). Attached is the draft permit for one of the dams (Dalles) and the permit fact sheet that covers the lower Columbia Dams.

For your quick review, I've cut and pasted key elements of the permit requirements (Effluents limits and Intake Structure Requirements) below so you can get a more specific understanding of our action. I've also cut/pasted below the discussion in the fact sheet that explains our intake structure requirements.

In sum, we believe the effluent limits will result in minimal impacts to T&E species (probably NLAA) and the intake structure requirements require exactly what is required by the FCRPS BiOp related to fish passage (i.e., Fish Passage Plan and Fish Operations Plan). So, our collective challenge is to figure out the best way to proceed with ESA consultation on the permits. We look forward to figuring out a streamlined ESA consultation given the likely minimal impacts of the effluent limits and that the FCRPS BiOp covers (will cover) the analysis/take associated with the intake structure requirements.

Jenny Wu, the permit writer, will also join us on the Monday call and possibly our attorney Courtney Webber.

Thanks,
John

Example of Effluent limits (page 8 of Dalles draft permit)

Table 2. Effluent Limitations and Monitoring Requirements for Outfalls 003, 004, 005, 006, 007, 008, 009, 010, 011, 012, 013, 014, 018, 019, 022, 023, 026, 027, 028, 029, 030, 031, 033 and 034: Main Units Non-Contact Cooling Water, Transformer Non-Contact Cooling Water, Station Service Non-Contact Cooling Water, and Fish Unit Non-Contact Cooling Water

Parameter	Units	Effluent Limitations	Monitoring Requirements		
			Sample Location	Sample Frequency	Sample Type
Parameters With Effluent Limits					
pH	std units	Between 6.5 – 8.5	Effluent	1/month	Grab
Oil and grease	mg/L	5 (daily maximum)	Effluent	1/month	Grab
Report Parameters					
Flow	mgd	Report	Effluent	1/month	Measurement
Temperature	7DADM°C[1]	Report	See Paragraph I.B.10 of this permit.	Continuous or 1/month [2]	Measurement/ Calculation
Visible Oil Sheen, Floating, Suspended, or Submerged Matter	--	See Paragraph I.B.4 of this permit.			Visual Observation

Notes
1. 7-day average daily maximum. This is a rolling 7-day average calculated by taking the average of the daily maximum temperatures.
2. See Paragraphs I.B.10 and I.B.11.

Requirements for Cooling Water Intake – Dalles Permit pg 14-16)

D. Cooling Water Intake Structure Requirements to Minimize Adverse Impacts from Impingement and Entrainment

1. Best Technology Available. The design, location, construction, and capacity of the permittee's cooling water intake structures (CWISs) shall reflect the best technology available (BTA) for minimizing adverse environmental impacts from

the impingement and entrainment of various life stages of fish (*e.g.*, eggs, larvae, juveniles, adults) by the CWISs.

2. The EPA has determined the following requirements as BTA as required by 40 CFR § 125.98(b)(6). To minimize entrainment mortality and to minimize impingement mortality, the permittee shall operate a system of technologies consistent with the permittee's most current Fish Passage Plan, including:

   a) Conduct spill releases over dam spillways according to schedules and guidelines in the most recent Fish Operations Plan and Fish Passage Plan.
   b) Keep juvenile fish passage structures, including ice and trash sluiceway, free of debris or other material, through regular and preventive maintenance and inspections.
   c) Operate turbines within +/- 1% peak efficiency, or as specified in the most recent Fish Passage Plan.
   d) Operate turbines in priority order to maximize fish passage as described in the Fish Passage Plan.
   e) Maintain a physical screening or exclusion technology that is consistent with the objectives of National Marine Fisheries Service (NMFS) guidelines found in NMFS Northwest Region's Anadromous Salmonid Passage Facility Design, Chapter 11: Fish Screen and Bypass Facilities.

3. The permittee must properly operate and maintain the technologies identified above as described in their most current Fish Passage Plan and as required by the Federal Columbia River Power System (FCRPS) 2014 Supplemental Biological Opinion, or any subsequent Biological Opinion that comes into effect.

4. The permittee must conduct regular visual inspections at a frequency specified in the most current Fish Passage Plan or employ remote monitoring devices to ensure that any technologies established as the BTA are maintained and operated to function as designed.

5. The permittee must maintain a copy of the most current Fish Passage Plan on-site at the facility and make it available to the EPA or an authorized representative upon request.

6. The permittee must prepare a 316(b) Annual Report documenting implementation, operations, and maintenance of BTA. The Report must include a certification statement required by 125.97(c) that BTA has been properly operated and maintained and that no changes to the facility have been made unless documented. The permittee may submit written notification as an electronic attachment to the DMR. The file name of the electronic attachment must be as

follows: YYYY_MM_DD_WA0026701_316b_05899, where YYYY_MM_DD is the date that the permittee submits the written notification.

<u>Discussion of Cooling Water Intake Requirement in Fact Sheet – pgs 43-49 – Lower Columbia River Fact Sheet</u>

D. **Cooling Water Intake Structure (CWIS)**

Section 316(b) of the CWA, 33 USC § 1316(b), requires that facilities with CWIS ensure that the location, design, construction, and capacity of the structure reflect the best technology available (BTA) to minimize adverse impacts on the environment. The rule establishes BTA standards to reduce impingement and entrainment of aquatic organisms at existing power generating and manufacturing facilities. Impingement occurs when fish or shellfish become entrapped on the outer part of intake screens and entrainment occurs when fish or shellfish pass through the screens and into the cooling water system.

On August 15, 2014, the EPA promulgated regulations (40 CFR 125.90) to implement CWA Section 316(b) at existing facilities with CWIS with a design intake flow greater than 2 MGD and that use at least 25% of the withdrawn water for cooling purposes. These regulations establish requirements for minimizing adverse environmental impacts associated with CWIS and procedures, including permit application requirements, for establishing the appropriate technology requirements. Together these requirements represent BTA for minimizing adverse environmental impacts associated with the use of CWIS. If a facility with a CWIS falls below the thresholds set forth in 40 CFR 125.90, then BTA is established on a case-by-case basis using best professional judgment.

McNary Lock and Dam has no cooling water discharges in Washington, so CWA Section 316(b) provisions do not apply. For the remaining projects, the total amount of cooling water taken in is more than 2 MGD and more than 25% of the withdrawn water is used for cooling purposes. The cooling water intakes for the Lower Columbia River hydroelectric facilities are the points where water is diverted for cooling water purposes. For example, where cooling water is drawn off the scroll case, the intake is the point where the water is diverted from the scroll case. The cooling water intake is *not* the gravity intake where water from the river is taken in for hydroelectric purposes. That intake is for pass-through water for hydroelectric purposes, which do not require an NPDES permit (*See National Wildlife Federation v. Consumers Power Company*, 862 F.2d 580 (6th Cir. 1988); *National Wildlife Federation v. Gorsuch,* 693 F.2d 156 (D.C. Cir. 1982). However, at the point that water is diverted for cooling water and pollutants are added, such as heat, those waters require NPDES permits.

To evaluate the 2 MGD threshold for design intake flows, the EPA used the amount of cooling water discharged as a proxy for the amount of cooling water taken in. Table 16 provides the total amount of cooling water discharged if every unit were operating at its maximum flow rate and all of the discharge was cooling water. While the projects are unlikely to discharge these high volumes at all times, the EPA assessed discharge flows that could occur to determine whether the 2 MGD threshold was met. The EPA did not include cooling water which might be present in drainage sumps and unwatering sumps, since this is likely to be small compared to leakage water. Each facility exceeded the 2 MGD threshold.

The EPA then assessed whether the 25% threshold was met for water withdrawn for cooling water purposes. In the case of most cooling water inputs in these facilities, the intake is at the point that water is extracted for cooling water from the scroll case or from where water is used for hydroelectric generating purposes. Thus, the point where water is extracted for cooling is nearly always 100%. Therefore, both thresholds are met. Table 16 summarizes the results.

Table 16. Summary of Maximum Daily Average Cooling Water Discharges from Lower Columbia River Hydroelectric Projects

	Bonneville Project	The Dalles Lock and Dam	John Day Project	McNary Lock and Dam
Cooling Water Discharges (MGD)	22 MGD	53 MGD	4.5 MGD	NA
Greater than 25% Water Used for Cooling Water	Yes	Yes	Yes	NA

Since the 2014 Rule applies to the Bonneville Project, The Dalles Lock and Dam, and John Day Project, they are required to meet 1 of 7 best technologies available (BTA) to minimize impingement mortality at 125.94(c) and to minimize adverse effects from entrainment at 125.94(f).

The Lower Columbia River dams are part of the Federal Columbia River Power System (FCRPS) which has a series of Biological Opinions (BiOps) issued by the National Oceanic and Atmospheric Administration (NOAA). These BiOps require actions called reasonable and prudent alternatives (RPAs) to minimize and address adverse effects to threatened and endangered salmon. Currently, the FCRPS 2014 BiOp and Supplemental BiOp are in effect and require the dams in the FCRPS to comply with RPAs from hydropower operations to increase threatened and endangered juvenile fish survivability and minimize fish mortality. These include operations and configuration improvements such as increased spilling to maximize fish passage through dams to achieve a 96% survival for juvenile spring Chinook Salmon and steelhead and 93% for subyearling chinook salmon. RPAs 18-20 are specific to optimizing the configurations and operations for the Bonneville Project, The Dalles Lock and Dam, and the John Day Project. RPAs 27 and 29-32 also require measures to optimize dam operations. As an example RPA, Table 17 shows RPA 32 for hydropower operations, which requires the Lower Columbia River and Lower Snake River hydroelectric projects to develop annual Fish Passage Plans (FPP) in coordination with NOAA and other federal, state and tribal agencies to prioritize, optimize, and maintain operations and maintenance for each facility to maintain high levels of fish survivability.

Table 17. RPA 32 for Hydropower Operations in 2014 FCRPS Supplemental BiOp for Bonneville Project, The Dalles Lock and Dam, and John Day Project

RPA No.	Action Description	Implementation Plans, Annual Progress Reporting and Comprehensive RPA Evaluations
Hydropower Strategy 4—Operate and Maintain Facilities at Corps' Mainstem Projects to Maintain Biological Performance		
32	**Fish Passage Plan** The Corps will annually prepare a FPP in coordination with NOAA Fisheries and the Regional Forum through the FPOM. The Corps will operate its projects (including juvenile and adult fish passage facilities) year-round in accordance with the criteria in the FPP. Comments developed by NOAA Fisheries on the draft FPP shall be reconciled by the Corps in writing to NOAA Fisheries' satisfaction before release of the final FPP. Key elements of the plan include: • Operate according to project-specific criteria and dates to operate and maintain fish facilities, turbine operating priorities, and spill patterns; • Operate according to fish transportation criteria; • Maintain turbine operations within the 1% of best efficiency range; • Maintain spillway discharge levels and dates to provide project spill for fish passage; • Implement TDG monitoring plan; • Operate according to protocols for fish trapping and handling; • Take advantage of low river conditions, low reservoir elevations or periods outside the juvenile migration season to accomplish repairs, maintenance, or inspections so there is little or no effect on juvenile fish; • Coordinate routine and non-routine maintenance that affects fish operations or structures to eliminate and/or minimize fish operation impacts; • Schedule routine maintenance during non-fish passage periods; • Conduct non-routine maintenance activities as needed; and • Coordinate criteria changes and emergency operations with FPOM. **Operations and Maintenance** • Provide redundancy or contingency plans, developed in coordination with NOAA Fisheries and the Regional Forum, which will assure that key adult fish passage facility equipment operates as necessary to minimize long-term adult passage delays. • Evaluate the condition of items necessary (e.g., spillway hoist systems, cranes, turbine units, AWS systems, etc.) to provide safe and effective fish passage and develop a prioritized list of these items that are likely to require maintenance now or within the term of this Opinion.	**Implementation Plans** • The FPP is prepared annually. **Annual Progress Report** • Not applicable. **2013 and 2016 Comprehensive RPA Evaluation Reports** • Not applicable.

The USACE publishes Fish Passage Plans each year on the technologies and operations each project uses to optimize fish survivability for threatened and endangered species as required by the FCRPS 2014 BiOp. The Corps develops these plans in conjunction with the Fish Passage Operations and Maintenance (FPOM) workgroup, a consortium of federal, state, and tribal agencies. Together, they determine detailed operations and maintenance procedures annually to optimize fish passage and maintain high rates of survivability.

Generally, the hydroelectric generating facilities' approach to maximum fish survivability is to route fish away from intakes for hydroelectric generating water that enters turbines, which are believed to have a higher likelihood of harming or killing fish. Instead, the facilities operate their dam spillways and non-turbine fish passage structures to encourage fish to use them, and at the Bonneville Project and John Day Project employ physical means to discourage fish from entering the intakes for hydroelectric generating water. These efforts to provide fish passage through non-turbine routes have been successful. According to the FCRPS 2016 BiOp Evaluation, 76-99% of juvenile salmonids through 2015, use non-turbine routes. The high rate of juvenile salmonids using non-turbine routes also translates to fish not being impinged or entrained in cooling water intake structures, which are downstream of the intakes for hydroelectric generating water.

Optimal spill requirements for fish passage are complex. The USACE in consultation with FPOM develops a Fish Operations Plan that specifies spill schedules including, flow, timing and shape of the spill to best maximize fish passage over the dams. The Fish Passage Plans (FPPs) require implementation of these spill schedules in addition to maintenance of structures leading to the spillways to ensure they are free of debris. All of the Lower Columbia River hydroelectric generating facilities also have juvenile fish passage structures, which provide alternative non-turbine pathways to bypass the dam. The Bonneville Project and John Day Project have submersible traveling screens (STS) which route fish to fish passage structures and deflect fish from entering into hydroelectric generating water intake structures that go to turbines. The Bonneville Project and John Day Project further use cold attraction water near juvenile fish passage structures to encourage fish to use these structures. Each of the facilities maintain and inspect screens leading to fish passage structures or diverting fish to structures regularly to ensure they are free of trash and debris. These structures are also operated according to FPP guidelines, such as specifying the water levels in gatewells leading to fish passage structures.

Where fish do enter the intake for hydroelectric generating waters and from where cooling water is withdrawn, the turbines are operated close to peak efficiency, which is believed to be optimal for fish to pass through turbines with the lowest mortality and harm. At lower flows, fish may enter parts of the turbine which will damage them. At too high flows, fish may not survive passage through turbines. At peak efficiency flows, juvenile fish may pass through the turbines with the least amount of damage. FPPs require that turbines at the Lower Columbia River hydroelectric generating facilities operate within +/- 1% of peak efficiency. Additionally, it requires turbines to be operated in priority order based on optimizing fish passage, related to location, turbine operation, and configuration. Thus, these technologies and operations together work to optimize fish passage.

The FPPs also have extensive maintenance and operation requirements, such as inspecting fish passage facilities 3 times a day, 7 days a week during fish passage, preventive maintenance and repair of submersible traveling screens, and ensuring trash racks are cleaned. These FPPs specifically list when and where different technologies should be operated to maximize fish passage. The Fish Passage Plan for 2018-2019 also describes detailed inspection and reporting criteria, including weekly written inspection reports to NOAA for out-of-criteria situations, adjustments to resolve issues, impacts to fish passage and survival, and equipment calibration. These actions, in sum, ensure that each project is evaluating and operating its systems to maximize fish survivability for threatened and endangered species. Because the FCRPS 2014 BiOp requires annual updates to FPPs, the hydropower facilities continually evaluate and optimize their operations to maximize fish passage.

To evaluate the adequacy and optimization of the hydropower operations and configuration, the projects conducted Juvenile Dam Passage Survival tests to assess the adequacy of technologies and found the Lower Columbia and Lower Snake hydropower projects were already meeting the 96% and 93% survival targets for fish passage in the FCRPS 2016 Comprehensive Evaluation. In addition, as previously stated, the 2016 Evaluation includes results showing juvenile salmonid use of non-turbine routes to be 76-99%. This further shows the effectiveness of technologies and operations at the hydropower facilities on the Lower Columbia River to encourage salmonids to avoid cooling water intake structures, thus minimizing impingement mortality and entrainment.

Though the focus of these studies are threatened and endangered species, the combination of technologies to deter fish from intakes, encourage fish to travel through fish passage structures or over spillways, and decrease velocities through turbines, for example, all act to minimize impingement and entrainment of aquatic life at cooling water intakes. Fish surveys at the John Day Project have noted bull trout, lamprey, juvenile sturgeon, and other listed species in juvenile fish bypass structures, indicating that other fish species use the structures designed for juvenile salmonid survival.

Table 18 summarizes the general technologies used at each project to maximize fish survivability from hydroelectric operations, described in the 2018-2019 FPP and 2016 BiOp Comprehensive Evaluation Report. It also summarizes dam passage survival rates for each project. Table 19 summarizes fish survival rates by fish species from 2008-2013.

Table 18. Hydropower Operations at Bonneville Project, The Dalles Lock and Dam, John Day Project for Fish Survival (2018-2019)

	BTA	**Average Fish Survival Rates**
Bonneville Project	*Non-turbine routes*: spill to maximize fish passage for juvenile salmonids, fish passage structures, attraction flow to fish passage structures, submersible traveling screens (STS) to deter fish from entering main unit turbines, vertical bar screens (VBS) near intakes, streamlined trashracks, *Turbine routes*: operate turbines at +/- 1% peak efficiency flows, operate turbines in priority order to maximize fish passage	96-98% (2011-2012)
The Dalles Lock and Dam	*Non-turbine routes*: spill to maximize fish passage for juvenile salmonids, fish passage structures via ice trash sluiceway (ITS) *Turbine routes*: operate turbines at +/- 1% peak efficiency flows, operate turbines in priority order to maximize fish passage	94-99% (2010-2012)
John Day Project	*Non-turbine routes*: spill to maximize fish passage for juvenile salmonids, temporary spillway weirs (TSWs) to encourage fish passage over spillway, fish passage structures with juvenile bypass structure (JBS), attraction flow to fish passage structures, STS to deter fish from entering main unit turbines, VBS near intakes, streamlined trashracks, *Turbine routes*: operate turbines at +/- 1% peak efficiency flows, operate turbines in priority order to maximize fish passage	94-99% (2011-2012)

Table 19. Juvenile Dam Passage Survival 2008-2013, 2014 FCRPS BiOp

Dam	Year	Species	Survival[1] %	Spill Operation Target	Spill Operation Actual
Bonneville	2011	Yearling Chinook Salmon	95.69	100 kcfs	100 kcfs
Bonneville	2011	Steelhead	97.55	100 kcfs	100 kcfs
Bonneville	2012	Subyearling Chinook Salmon	97.39	85 kcfs day 121 kcfs night 95 kcfs 24 hrs	149 kcfs 149 kcfs
The Dalles	2010	Yearling Chinook Salmon	96.41	40%	40%
The Dalles	2011	Yearling Chinook Salmon	96.00	40%	40%
The Dalles	2010	Steelhead	95.34	40%	40%
The Dalles	2011	Steelhead	99.52	40%	40%
The Dalles	2010	Subyearling Chinook Salmon	94.04	40%	40%
The Dalles	2012	Subyearling Chinook Salmon	94.69	40%	40%
John Day	2011	Yearling Chinook Salmon	96.66 97.84	30% 40%	30% 40%
John Day	2011	Steelhead	98.36 98.97	30% 40%	30% 40%
John Day	2012	Yearling Chinook Salmon	96.73	30% 40%	37.1% 37.1%
John Day	2012	Steelhead	97.44	30% 40%	37.1% 37.1%
John Day	2012	Subyearling Chinook Salmon	94.14	30% 40%	37.9% 37.9%

The EPA has determined the best technology available (BTA) for minimizing impingement mortality and entrainment at the Bonneville Project, The Dalles Lock and Dam, and the John Day Project to be the technologies in Table 18. These BTA fall under 40 CFR 125.94(c)(6), systems of technologies, and is 1 of the 7 BTA standards under 40 CFR 125.94(c) for minimizing impingement of fish in cooling water intake structures.

The systems of technologies to address impingement mortality under 40 CFR 125.94(c)(6) must be informed by an impingement technology performance optimization study at 40 CFR 122.21(r)(6)(ii). To evaluate the juvenile dam passage survival performance standards, the Bonneville Project, The Dalles Lock and Dam, and the John Day Project conducted at least two years of testing to determine fish survival targets at each project described earlier with results summarized in Tables 18 and 19. As described earlier, the FCRPS 2014 BiOp RPAs further require annual studies to optimize fish passage. In addition, each facility has an RPA to optimize its operations for survival of threatened and endangered salmon, which require annual or biannual BiOp Implementation reports. The EPA has determined that these biological studies and additional studies required by the FCRPS 2014 Supplemental BiOp meet the conditions of an impingement technology performance optimization study at 40 CFR 122.21(r)(6)(ii).

The EPA has further determined that BTA for minimizing impingement mortality and entrainment are the system of technologies in Table 18. Biological studies in the 2014 FCRPS Supplemental

BiOp show survival rates for multiple endangered juvenile salmonids over 90% with technologies from 2008-2013. In comparison, 40 CFR 125.94(c)(7) requires a 12-month impingement mortality of no more than 24%, or a 76% survivability rate. Hydroelectric generating facilities have further optimized operations and technologies through improvements documented in annual Fish Passage Plans. Thus, the existing systems of technologies at the facilities are effective in the prevention of impingement and entrainment at cooling water intakes.

40 CFR 125.98(f) also require the EPA to describe how specific factors were considered in assessing the adequacy of BTA entrainment technology. These factors are: numbers and types of organisms, impact from changes in particulate emissions from technologies, land availability, remaining useful plant life, and quantified and qualified social benefits and costs. The EPA considered the effectiveness of the entrainment technology in protecting numbers and types of organisms most heavily in determining the BTA for entrainment. The BTA for entrainment rely heavily on preventing entrainment of organisms in the intake, which provides the most benefits for potentially affected organisms. There are no particulate emission considerations from the proposed BTA entrainment technologies. The EPA weighed land availability less because of the impractability of significantly changing the cooling water intake from the scroll case, which would require significant construction in the internal hydroelectric generating operations. In addition, preventing fish from entering into the cooling water intake, the current entrainment BTA, is more effective in reducing harmful impacts to organisms. Similarly, the EPA weighed remaining useful plant life less, since the current entrainment BTA provides more benefits to organisms. The EPA considered the entrainment BTA to have quantified and qualitative social benefits regarding protection of fish and the economic benefits to communities with fishing recreation.

Though these optimization studies are for juvenile salmonids, these fish species are a reasonable proxy for other fish species, such as bull trout, lamprey, juvenile sturgeon observed in juvenile fish passage structures, since threatened and endangered salmon are the most sensitive species. In addition, as described earlier, the rate of juvenile salmonids entering in non-turbine pathways range from 76-99% showing that fish in general may be avoiding hydroelectric water intake structures which supply water from which cooling water intakes withdraw. The permits also require compliance with annual Fish Passage Plans. These BTA with other permit requirements will help ensure that fish impingement mortality and entrainment at cooling water intake structures are minimized and that they are maintained and optimized throughout the permit cycle.

From: Wu, Jennifer
Sent: Tuesday, September 18, 2018 12:47 PM
To: Palmer, John <Palmer.John@epa.gov>; Burgess, Karen <Burgess.Karen@epa.gov>
Subject: WA Hydro permits and Fact Sheets on Columbia River

Hi John and Karen, FYI here's one preliminary draft permit and Fact Sheet for 401 Cert for the Lower Columbia River WA hydros. FYI for the 316(b) write-up. Karen, these are on the Unit Sharepoint under Permit Documents Under Review.

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